ABSTRACT

TITLE: An observational study to evaluate the additional benefit of dual-energy CT and phonation CT in the pre-operative local staging of laryngeal and hypopharyngeal cancers

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OBJECTIVE:

To evaluate the additional benefit and diagnostic accuracy of both phonation CT and dual-energy CT in comparison to the weighted average CT imaging in the local staging of laryngeal and hypopharyngeal cancers.

METHODS:

The institutional review board approved this prospective study and written informed consent was obtained from all patients. 90 consecutive patients underwent 64-section dual-energy CT to stage laryngeal (n=84) and hypopharyngeal (n=6) cancers. Additional limited “eee” phonation CT was performed through the larynx. Iodine-density images was interpreted using AW Server 2.0 software, in GSI general mode.

Endoscopy findings were obtained for all patients. 13 patients underwent surgery (14%) and findings from histopathological examination were obtained. Endoscopy and histopathology findings when available were used as the standard of reference for the evaluation of diagnostic performance with receiver operating characteristic (ROC) curve analysis and in terms of sensitivity and specificity.

RESULTS:

For pyriform sinus involvement, “eee” phonation CT showed a slightly higher accuracy than weighted-average imaging (AUC: 0.9 vs 0.878), respectively. Dual-energy CT showed a slightly higher accuracy than weighted-average imaging for thyroid cartilage invasion (AUC: 0.567 vs 0.467 respectively). Prevertebral muscle invasion was more often identified on dual-energy CT than weighted-average images, however we were not able to provide diagnostic accuracies for prevertebral muscle invasion as surgery was precluded in these patients due to locally advanced disease. Although, mild added accuracy for dual-energy and phonation was found, we do not recommend routine use of these modalities due to poor statistical significance.

KEYWORDS: laryngeal cancer, hypopharyngeal cancer, computerised tomography, dual-energy CT, “eee” phonation